

I claim:

1. Method for enhancing the optical transparency of biological tissue covered by a surface permeability barrier of tissue, said method comprising:
 - a) bypassing said surface permeability barrier of tissue to permit the delivery of a clarifying agent past said surface permeability barrier of tissue to said covered biological tissue,
 - b) delivering said clarifying agent past said surface permeability barrier of tissue to said covered biological tissue to enhance the optical transparency thereof.
2. Method as in claim 1, said covered biological tissue having interstitial space and interstitial fluid within said interstitial space, wherein:
 - c) said clarifying agent alters the refractive index of said interstitial fluid to reduce the heterogeneity of the refractive indices within said covered biological tissue thereby reducing the level of optical scattering within said covered biological tissue.
3. Method as in claim 1, wherein:
 - c) the step of bypassing said surface permeability barrier of tissue is performed by abrading said surface permeability barrier of tissue.
4. Method as in claim 1, wherein:
 - c) the step of bypassing said surface permeability barrier of tissue is performed by applying iontophoresis across surface permeability barrier of tissue.

5. Method as in claim 1, wherein:

- c) the step of bypassing said surface permeability barrier of tissue is performed by applying electroporation across surface permeability barrier of tissue.

6. Method as in claim 1, wherein:

- c) the step of bypassing said surface permeability barrier of tissue is performed by applying acoustic pressure to said surface permeability barrier of tissue.

7. Method as in claim 1, wherein:

- c) the step of bypassing said surface permeability barrier of tissue is performed by applying optical pressure to said surface permeability barrier of tissue.

8. Method as in claim 1, wherein:

- c) the step of bypassing said surface permeability barrier of tissue is performed by applying a temperature gradient across said surface permeability barrier of tissue.

9. Method as in claim 1, wherein:

- c) the step of bypassing said surface permeability barrier of tissue is performed by applying a concentration gradient across said surface permeability barrier of tissue of clarifying agent or a carrier agent for increasing the permeability of said surface permeability barrier of tissue and carrying said clarifying agent.

10. Method as in claim 1, wherein:

- c) the step of bypassing said surface permeability barrier of tissue is performed by applying a driving force across said surface permeability barrier of tissue sufficient to move molecules of said clarifying agent past said surface permeability barrier of tissue and into said covered biological tissue.

11. Method as in claim 1, wherein:

- c) the step of bypassing said surface permeability barrier of tissue is performed by stripping a portion of said surface permeability barrier of tissue.

12. Method as in claim 1, wherein:

- c) the step of bypassing said surface permeability barrier of tissue is performed by ablating said surface permeability barrier of tissue.

13. Method as in claim 1, wherein:

- c) the step of bypassing said surface permeability barrier of tissue is performed by applying sonophoresis across said surface permeability barrier of tissue.

14. Method as in claim 1, wherein:

- c) the step of bypassing said surface permeability barrier of tissue is performed by applying a penetrating solvent to said surface permeability barrier of tissue to increase the permeability of said surface permeability barrier of tissue thereby permitting the passage therethrough of a clarifying agent.

15. Method as in claim 1, wherein:

- c) the step of bypassing said surface permeability barrier of tissue is performed by injecting said clarifying agent past said surface permeability barrier of tissue and into said covered biological tissue.

16. Method as in claim 1, wherein:

- c) prior to step (a), a clarifying agent is administered topically onto the surface permeability barrier of tissue, and subsequently,
- d) step (a) is performed by inserting an array of needles through said surface permeability barrier of tissue and into said covered biological tissue, said needles having a length short enough to avoid reaching nerve endings in said covered biological tissue, said array of needles producing a pattern of apertures through said surface permeability barrier of tissue, through which apertures clarifying agent may pass.

17. Method for performing a diagnostic or therapeutic procedure on biological tissue covered by a surface permeability barrier of tissue, said diagnostic and therapeutic procedure requiring optical access into said covered biological tissue, said method comprising:

- a) providing means for bypassing said surface permeability barrier of tissue to permit the delivery of a clarifying agent past said surface permeability barrier of tissue to said covered biological tissue,
- b) delivering said clarifying agent past said surface permeability barrier of tissue to said covered biological tissue to enhance the optical transparency thereof on a transient basis,

- c) performing said diagnostic or therapeutic procedure on said covered biological tissue while the optical transparency thereof has been enhanced.

18. Method as in claim 17, wherein

- d) said therapeutic application is directed at affecting skin appendages.

19. Method as in claim 18, wherein

- d) said skin appendages are sebaceous glands.

20. Method as in claim 18, wherein

- d) said skin appendages are hair follicles.

21. Method as in claim 18, wherein

- d) said skin appendages are eccrine glands.

22. Method as in claim 17, wherein

- d) said therapeutic application is directed at affecting subcutaneous fat.

23. Method as in claim 17, wherein

- d) said therapeutic application is directed at treating pigmented lesions of the skin.

24. Method as in claim 17, wherein

- d) said therapeutic application is directed at treating vascular lesions of the skin.

25. Method as in claim 17, wherein

d) said diagnostic application is directed at light microscopy of biological tissue.

26. Method as in claim 17, wherein

d) said diagnostic application is directed at confocal microscopy of biological tissue.

27. Method as in claim 17, wherein

d) said diagnostic application is directed at optical coherence tomography of biological tissue.

28. Method as in claim 17, wherein

d) said diagnostic application is directed at fluorescence spectroscopy of biological tissue.

29. Method as in claim 17, wherein

d) said diagnostic application is directed at reflectance spectroscopy of biological tissue.

30. Method as in claim 17, wherein

d) said diagnostic application is directed at non-invasive analyte sensing.

31. Method as in claim 17, wherein

d) said diagnostic application is directed at measuring the glucose concentration in blood.

32. Method as in claim 17, wherein

d) said diagnostic application is directed at measuring the glucose concentration in interstitial fluids.

33. Method as in claim 17, wherein

d) said diagnostic application is directed at measuring cholesterol concentration in blood.

34. Method as in claim 17, wherein

d) said diagnostic application is directed at optical tomography of biological tissue.

35. Method as in claim 17, wherein

d) said diagnostic application is directed at photodynamic detection of abnormal tissue.

36. Method as in claim 17, said covered biological tissue having interstitial space and interstitial fluid within said interstitial space, wherein:

d) said clarifying agent alters the refractive index of said interstitial fluid on a transient basis to reduce the heterogeneity of the refractive indices within said covered biological tissue thereby to reduce the level of optical scattering within said covered biological tissue.

37. Apparatus for enhancing the optical transparency of biological tissue covered by a surface permeability barrier of tissue, said apparatus comprising:

- a) means for bypassing said surface permeability barrier of tissue to permit the delivery of a clarifying agent past said surface permeability barrier of tissue to said covered biological tissue,
- b) means for delivering said clarifying agent past said surface permeability barrier of tissue to said covered biological tissue to enhance optical transparency thereof,
- c) means for delivery of light to, and/or collection of light from said covered biological tissue for diagnostic or therapeutic applications.

38. Apparatus as in claim 37, wherein

- d) said therapeutic application is directed at affecting skin appendages.

39. Apparatus as in claim 38, wherein

- d) said skin appendages are sebaceous glands.

40. Apparatus as in claim 38, wherein

- d) said skin appendages are hair follicles.

41. Apparatus as in claim 38, wherein

- d) said skin appendages are eccrine glands.

42. Apparatus as in claim 37, wherein

- d) said therapeutic application is directed at affecting subcutaneous fat.

43. Apparatus as in claim 37, wherein

- d) said therapeutic application is directed at treating pigmented lesions of the skin.

44. Apparatus as in claim 37, wherein
- d) said therapeutic application is directed at treating vascular lesions of the skin.
45. Apparatus as in claim 37, wherein
- d) said diagnostic application is directed at light microscopy of biological tissue.
46. Apparatus as in claim 37, wherein
- d) said diagnostic application is directed at confocal microscopy of biological tissue.
47. Apparatus as in claim 37, wherein
- d) said diagnostic application is directed at optical coherence tomography of biological tissue.
48. Apparatus as in claim 37, wherein
- d) said diagnostic application is directed at fluorescence spectroscopy of biological tissue.
49. Apparatus as in claim 37, wherein
- d) said diagnostic application is directed at reflectance spectroscopy of biological tissue.
50. Apparatus as in claim 37, wherein
- d) said diagnostic application is directed at non-invasive analyte sensing.

51. Apparatus as in claim 37, wherein

d) said diagnostic application is directed at measuring the glucose concentration in blood.

52. Apparatus as in claim 37, wherein

d) said diagnostic application is directed at measuring the glucose concentration in interstitial fluids.

53. Apparatus as in claim 37, wherein

d) said diagnostic application is directed at measuring cholesterol concentration in blood.

54. Apparatus as in claim 37, wherein

d) said diagnostic application is directed at optical tomography of biological tissue.

55. Apparatus as in claim 37, wherein

d) said diagnostic application is directed at photodynamic detection of abnormal tissue.

56. Apparatus as in claim 37, wherein

d) said means for bypassing said surface permeability barrier of tissue comprises abrading means to abrade said surface permeability barrier of tissue.

57. Apparatus as in claim 37, wherein

d) said means for bypassing said surface permeability barrier of tissue comprises an iontophoresis system to apply iontophoresis across said surface permeability barrier of tissue.

58. Apparatus as in claim 37, wherein

d) said means for bypassing said surface permeability barrier of tissue comprises an electric pulse generator to induce electroporation of said surface permeability barrier of tissue.

59. Apparatus as in claim 37, wherein

d) said means for bypassing said surface permeability barrier of tissue comprises an acoustic generator to apply acoustic pressure to said surface permeability barrier of tissue.

60. Apparatus as in claim 37, wherein

d) said means for bypassing said surface permeability barrier of tissue comprises means to apply optical pressure to said surface permeability barrier of tissue.

61. Apparatus as in claim 37, wherein

d) said means for bypassing said surface permeability barrier of tissue comprises means to apply a temperature gradient across said surface permeability barrier of tissue.

62. Apparatus as in claim 37, wherein

d) said means for bypassing said surface permeability barrier of tissue comprises means to apply a concentration gradient across said surface

permeability barrier of tissue of a clarifying agent or of a carrier agent, carrying said clarifying agent and increasing the permeability of said surface permeability barrier of tissue.

63. Apparatus as in claim 37, wherein

- d) said means for bypassing said surface permeability barrier of tissue comprises an adhesive tape for stripping a portion of said surface permeability barrier of tissue.

64. Apparatus as in claim 37, wherein

- d) said means for bypassing said surface permeability barrier of tissue comprises a laser to ablate said surface permeability barrier of tissue.

65. Apparatus as in claim 37, wherein

- d) said means for bypassing said surface permeability barrier of tissue comprises an ultrasonic generator to apply sonophoresis across said surface permeability barrier of tissue.

66. Apparatus as in claim 37, wherein

- d) said means for bypassing said surface permeability barrier of tissue comprises a radiofrequency generator to ablate said surface permeability barrier of tissue.

67. Apparatus as in claim 37, wherein

- d) said means for bypassing said surface permeability barrier of tissue comprises an electrical generator that delivers electric arcs at the delivery probe tip to said surface permeability barrier of tissue.

68. Apparatus as in claim 37, wherein

- d) said means for bypassing said surface permeability barrier of tissue comprises means to apply a penetrating solvent to said surface permeability barrier of tissue to increase the permeability of said surface permeability barrier of tissue thereby permitting the passage therethrough of said clarifying agent.

69. Apparatus as in claim 37, wherein

- d) said means for bypassing said surface permeability barrier of tissue comprises a syringe to inject said clarifying agent past said surface permeability barrier of tissue and into said covered biological tissue.